360798

NEWARK PUBLIC LIBRARY

APR 15 1981

U. S. GOVT. PUBS.
DEPOSITORY 376

FLOOD INSURANCE STUDY

VILLAGE OF LINDENHURST, NEW YORK
SUFFOLK COUNTY

JUNE 1981

federal emergency management agency
federal insurance administration

COMMUNITY NUMBER - 360798

FEMA 209:

TABLE OF CONTENTS

		Page
1.0	INTRODUCTION	1
	1.1 Purpose of Study	1
	1.2 Coordination	1
	1.3 Authorization and Financing	1
2.0	AREA STUDIED	2
	2.1 Scope of Study	2
	2.2 Community Description	2
	2.3 Principal Flood Problems	4
	2.4 Flood Protection Measures	4
3.0	ENGINEERING METHODS	4
	3.1 Hydrologic Analyses	5
	3.2 Hydraulic Analyses	5
4.0	FLOOD PLAIN MANAGEMENT APPLICATIONS	7
	4.1 Flood Boundaries	7
	4.2 Floodways	8
5.0	INSURANCE APPLICATION	8
	5.1 Reach Determinations	9
	5.2 Flood Hazard Factors	9
	5.3 Flood Insurance Zones	9
	5.4 Flood Insurance Rate Map Description	10

TABLE OF CONTENTS - continued

	Page
6.0 OTHER STUDIES	10
7.0 LOCATION OF DATA	12
8.0 BIBLIOGRAPHY AND REFERENCES	12

FIGURES

Figure 1 - Vicinity Map	3
Figure 2 - Frequency Tide Elevation Curve - Great South Bay	6

TABLES

Table 1 - Flood Insurance Zone Data	11

EXHIBITS

Exhibit 1 - Flood Insurance Rate Map	Panel 01

FLOOD INSURANCE STUDY
VILLAGE OF LINDENHURST, NEW YORK

1.0 INTRODUCTION

1.1 Purpose of Study

The purpose of this Flood Insurance Study is to investigate the existence and severity of flood hazards in the Village of Lindenhurst, Suffolk County, New York, and to aid in the administration of the Flood Insurance Act of 1973. Initial use of this information will be to convert Lindenhurst to the regular program of flood insurance by the Federal Insurance Administration. Further use of the information will be made by local and regional planners in their efforts to promote sound land use and flood plain development.

1.2 Coordination

A search for basic data was made at all levels of government. The New York State Department of Transportation, the Suffolk County Planning Department, the United States Geological Survey, the National Geodetic Survey and the Tri-State Transportation Commission provided information coordinated with this study.

An initial coordination conference was held on August 7, 1974 which was attended by representatives from the U. S. Army Corps of Engineers, the Federal Insurance Administration and the Village of Lindenhurst to discuss flooding problems in the study area.

A final coordination conference was held on April 6, 1976 at the Lindenhurst Village Hall. In attendance were members of the Village Board of Trustees and representatives of the Federal Insurance Administration and of the U. S. Army Corps of Engineers. The study results were received without correction.

1.3 Authorization and Financing

This Flood Insurance Study was conducted by the U.S. Army Corps of Engineers, New York District, at the request of the Federal Insurance Administration, U.S. Department of Housing and Urban Development. The source of authority for the study is the National Flood Insurance Act of 1968, as amended. Authority and financing are contained in Interagency Agreement No. (IAA)-H-16-75 Project Order No. 15.

2.0 AREA STUDIED

2.1 Scope of Study

This Flood Insurance Study covers the incorporated area of Lindenhurst, Suffolk County, New York. The area of study is shown on the Vicinity Map (Figure 1).

Areas flooded by storm tidal surges from Great South Bay were studied in detail. Strongs Creek, Neguntatogue Creek, and Santapogue Creek and its tributary were studied by approximate methods. Flooding in the past on these streams has been primarily due to tidal surges, with little or no apparent influence from interior precipitation.

The areas affected by tidal storm surges were evaluated with consideration given to all forecasted development and proposed construction for the next five years (November, 1980).

There is no observable organized floodway definition at the present time.

2.2 Community Description

The incorporated Village of Lindenhurst is located approximately 30 miles east of New York City along the south shore of Long Island, New York. The village is bounded on the west, north and east by the Town of Babylon and on the south by the Great South Bay.

The community is heavily suburban and fronts upon the Great South Bay. The southern limit of the Great South Bay is formed by a barrier island. The average southerly fetch of the Great South Bay between the barrier island and the mainland is 1.9 miles. The Atlantic Ocean lies to the south of the barrier island.

The village experienced its greatest rate of growth within the last three decades. Development within the flood plains and outside the flood plains is both residential and industrial. The area is commercially active, centering upon the fishing and boating industry.

The village's total area is 3.81 square miles. The 1970 census population was 28,359. The unofficial population as of 1 January 1974 is 29,739, a growth of 4.9 percent in four years. There were 7,665 single family dwelling units as per the 1970 census.

North Lindenhurst
North Amityville
BABYLON
LINDENHURST
Copiague
AMITYVILLE
Amity Harbor
Copiague Neck
Great East Neck
Little Neck
Neck
Santapogue Point
Fleet Point
Strongs Point
GREAT SOUTH BAY
Great South Bay
Great Neck Creek
Great Neck
Amityville Creek
Long Island Expressway
Sunrise Highway
Southern State Parkway
Zahns Airport
Queen of the Rosary Academy
Trinity Cem
Amityville Cemetery
Northeast Sch
Amityville Jr High Sch
Drive-in Theater
Copiague Jr High Sch
Copiague High Sch
William Rall Sch
Fire Sta
Babylon Townhall
Brestau Cem
Niagara Ave Sch
Daniel St Sch
Smyrnia Mem Park
Albany Ave Sch
School St Sch
Our Lady of Perpetual Help Jr High Sch
Library
Village Hall
West Gates Ave Sch
Pinehurst Park
Wiley Sch
Scudder Ave Sch
Great Neck Road Sch
St Martin of Tours Sch
Park Ave Sch
Avon Lake
Amityville Mem High Sch
Deauville Gardens Sch
Hospital
West Babylon Jr High Sch
West Babylon High Sch
Our Lady of Grace Sch
South Bay Sch
John F Kennedy Sch
Harding Ave Sch
Radio Station WBAB
Gasing Sta
Memor Park
Park
Trailer Park
Ronek Park
Municipal Sch
Light

APPROXIMATE SCALE
0 2000 4000 6000 8000 FEET

VICINITY MAP

FEDERAL EMERGENCY MANAGEMENT AGENCY
Federal Insurance Administration

VILLAGE OF LINDENHURST, NY
(SUFFOLK CO.)

FIGURE 1

The topography is fairly flat throughout the village, the land rising evenly from the shoreline at an average slope of 0.0018. Almost completely suburban throughout its area, the time of concentration of rainwater is relatively short, but a drainage system carries the accumulations quickly to the watercourses which have easy access to the Great South Bay.

The average maximum and minimum temperatures are 59°F. and 43°F. respectively. Mean annual precipitation is 43.4 inches.

2.3 Principal Flood Problems

Inundation is due primarily to tidal flooding during severe storms.

Between the years 1635 and 1962 there were 239 storms that passed through Atlantic Coastal Zone 4, which includes the Village of Lindenhurst (References 1, 2 and 3). In recent times, the hurricane of September 21, 1938 with a high water mark of approximately 4.7 feet, Hurricane Carol of August 31, 1954, Hurricane Donna of September 12, 1960 with a high water mark of approximately 4.3 feet, and the storm of March 6 to 8, 1962 are indicative of the severity of floods in this area (Reference 4).

2.4 Flood Protection Measures

Inasmuch as the flooding experience has been a result of tidal surges, the principal flood protection consists of extensive bulkheading along the shoreline fronting upon the Great South Bay. Dune heights at the barrier island act to protect the shoreline from the worst effects of ocean storms.

3.0 ENGINEERING METHODS

For tidal surges affecting the community, standard coastal engineering study methods were used to determine the flood hazard data required for this study. Tidal surges having recurrence intervals of 10, 50, 100, and 500 years have been selected as having special significance for the land use and flood insurance applications of the flood insurance program. The analyses reported here reflect current conditions of the coastal areas.

3.1 Hydrologic Analyses

Hydrologic analyses were carried out to establish the tidal elevation-frequency relationships for floods caused by tidal surges of the selected recurrence intervals for Great South Bay.

As an aid to estimating the extent of fluvial flooding by approximate methods, records of stream discharges for three gaged watercourses on Long Island; Santapogue Creek, Carlls River and Sampawams Creek were accumulated for the period 1944 to 1973 (Reference 5). The data was related to the 100-year recurrence interval frequency by following the standard log-Pearson Type III method as outlined by the Water Resources Council (Reference 6).

The synthetic 100-year discharges for Strongs Creek and Neguntatogue Creek were derived by first defining their watershed outlines and comparing them to the Santapogue Creek basin.

The data thus developed was employed only as a rough guide to assist in judging the flooding potential of the fluvial streams. Drainage area-peak discharge curves are not appropriate to the approximate study method and are therefore omitted from this report.

Tide levels representative of the 10-, 50-, 100-, and 500-year recurrence intervals were derived from data developed by the U. S. Army Corps of Engineers. The stage frequency curve for Great South Bay was obtained by routing the ocean water resulting from a moderate hurricane, the September 1938 storm, and the Standard Project Hurricane[1] through the various inlets and over the barrier island (neglecting the minor effect of rainfall) and correlating the results with the composite tidal elevation-frequency curve. The composite tidal elevation-frequency curve was developed by a statistical analysis of the high tides of record at the Sandy Hook, New Jersey gage since 1933. The basic method of analysis was the use of Beard's Plotting Positions (Reference 7). The tide elevations are plotted against expected return-frequency in Figure 2. The return-frequency is the number of consecutive years within which, on the average, a given tide elevation can be expected to be equaled or exceeded.

3.2 Hydraulic Analyses

Approximate analyses of the hydraulic characteristics of the flooding sources in the Village of Lindenhurst were carried out to provide estimates of the elevation of the 100-year flood.

---

[1]The Standard Project Hurricane is a hypothetical hurricane intended to represent the most severe combination of hurricane parameters that is reasonably characteristic of this region, excluding extremely rare combinations.

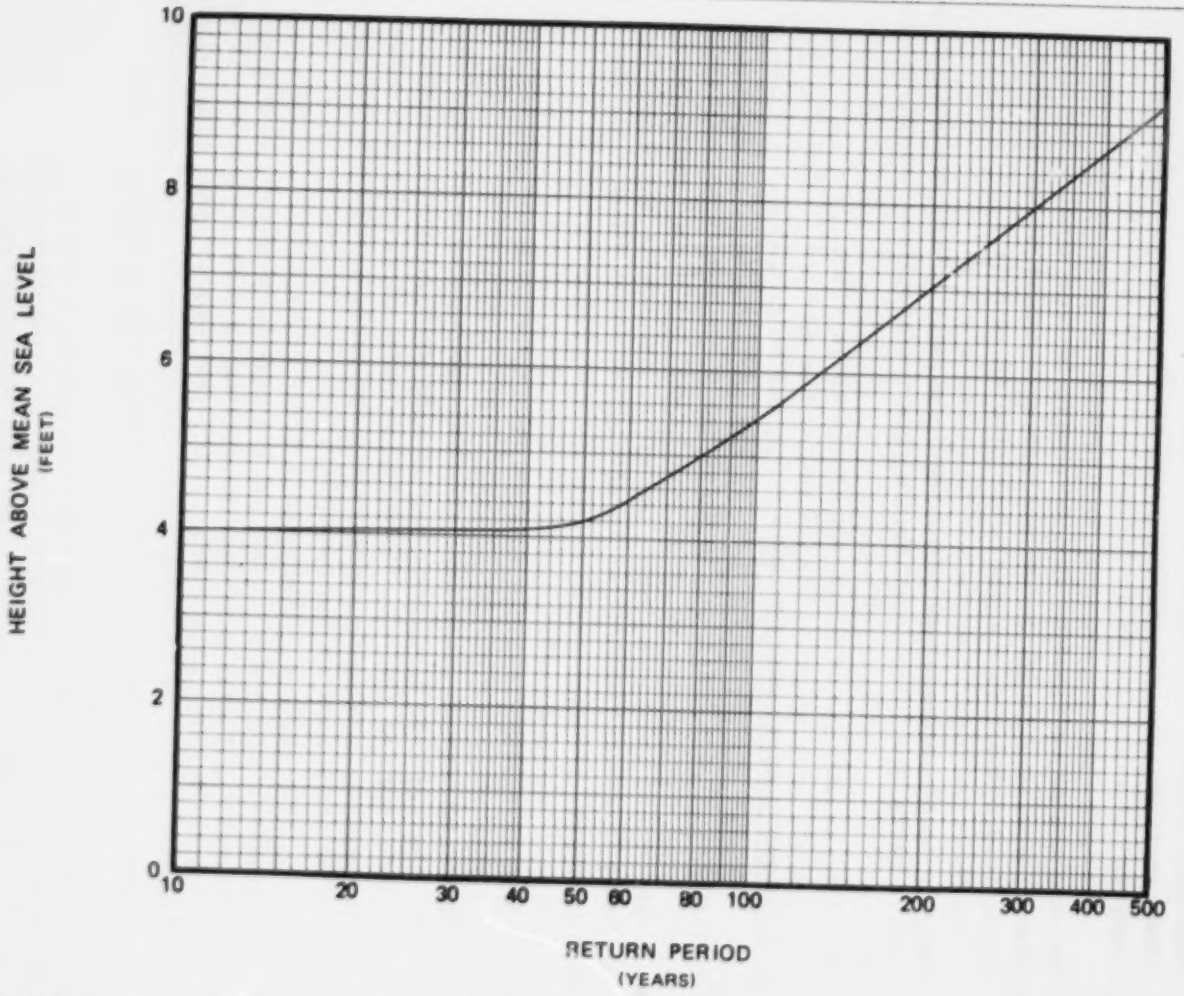

FIGURE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY
Federal Insurance Administration

VILLAGE OF LINDENHURST, NY
(SUFFOLK CO.)

TIDAL ELEVATION-FREQUENCY CURVE

GREAT SOUTH BAY

Aerial photographs (Reference 8), field investigations and surveys, and Flood Prone Maps (Reference 9) provided data which was integrated with the standard step method of backwater analyses to provide the most probable extent of flooding that would result from a 100-year storm.

The approximate study method is not appropriate for development of flood profiles, therefore flood profiles are not included in this report.

Because the major flooding in Lindenhurst is from tidal - not fluvial - sources, hydraulic computations were not required to establish flood boundaries for the areas studied in detail.

All elevations are measured from mean sea level datum; elevation reference marks used in this study are shown on the Flood Insurance Rate Map.

4.0 FLOOD PLAIN MANAGEMENT APPLICATIONS

A prime purpose of the National Flood Insurance Program is to encourage state and local governments to adopt sound flood plain management programs. Each Flood Insurance Study, therefore, includes a flood boundary map designed to assist communities in developing sound flood plain management measures.

4.1 Flood Boundaries

In order to provide a national standard without regional discrimination, the 100-year flood has been adopted by the Federal Insurance Administration as the base flood for purposes of flood plain management measures. The 500-year flood is employed to indicate additional areas of flood risk in the community.

The boundaries of the 100-year and 500-year tidal floods have been determined by utilizing available topographic data (Reference 10) and field surveys. In cases where the 100-year and 500-year tidal flood boundaries are close together, only the 100-year tidal flood boundary is shown.

For streams studied by approximate methods, the boundaries of the 100-year flood were determined by field surveys and investigations correlated with aerial photographs (Reference 8), and Flood Prone Maps (Reference 9).

The 100-year flood boundaries of areas subjected to tidal flooding were determined by tracing, on 1"=200', 5 foot contour interval topographic maps (Reference 10), the outline of the interpolated contour which was equivalent to the elevation of the 100-year recurrence interval tide.

Flood boundaries are indicated on the Flood Insurance Rate Map (Panel H&I 01). On this map, the 100-year flood boundary corresponds to the boundary of the areas of special flood hazards (Zone A3); and the 500-year flood boundary corresponds to the boundary of areas of moderate flood hazards (Zone B).

Small areas within the flood boundaries may lie above the flood elevations and therefore not be subject to flooding; owing to limitations of the map scale, such areas are not shown. Where the width of the approximate flooded plains are too narrow to be shown on the maps because of map scale limitations, they are also not shown.

4.2 Floodways

The floodway concept does not apply in this study because of the inexact nature of estimating water-surface levels by the approximate method. In the case of tidal flooding, the floodway concept is also inapplicable because of the vast water volume represented by the oceans, which tends to maintain the 100-year tidal surge elevation without regard to any artificial fill or other device which would restrict the intrusion of sea water and which would result in raising the tidal level by any predetermined or calculable amount.

Therefore, this Flood Insurance Study does not include a Flood Boundary and Floodway Map. The Flood Insurance Rate Map shows the flood boundaries for flooding affecting Lindenhurst.

5.0 INSURANCE APPLICATION

In order to establish actuarial insurance rates, the Federal Insurance Administration has developed a process to transform the data from the engineering study into flood insurance criteria. This process includes the determination of reaches, Flood Hazard Factors, and flood insurance zone designations for each flooding source affecting Lindenhurst.

5.1 Reach Determinations

Reaches are defined as lengths of watercourses having relatively the same flood hazard, based on the average weighted difference in water-surface elevations between the 10- and 100-year floods. This difference does not have a variation greater than that indicated in the following table for more than 20 percent of the reach.

Average Difference Between 10- and 100-Year Floods	Variation
Less than 2 feet	0.5 foot

Because of the tidal nature of the flooding only one reach is required in order to meet the above criterion for Lindenhurst. This is the Great South Bay Reach.

5.2 Flood Hazard Factors

The Flood Hazard Factor (FHF) is the Federal Insurance Administration device used to correlate flood information with insurance rate tables. Correlations between property damage from floods and their FHF are used to set actuarial insurance premium rate tables based on FHFs from 005 to 200.

The FHF for a reach is the average weighted difference between the 10- and 100-year flood water-surface elevations expressed to the nearest one-half foot, and shown as a three digit code.

For example, if the difference between water-surface elevations of the 10-year and 100-year floods is 0.7 foot, the FHF is 005; if the difference is 1.4 feet, the FHF is 015; if the difference is 5.0 feet, the FHF is 050. When the difference between the 10-year and 100-year water-surface elevations is greater than 10.0 feet, accuracy for the FHF is to the nearest foot.

5.3 Flood Insurance Zones

After the determination of reaches and their respective Flood Hazard Factors, the entire incorporated area of Lindenhurst was divided into zones, each having a specific flood potential or hazard. Each zone was assigned one of the following flood insurance zone designations.

Zone A: Special Flood Hazard Areas inundated by the 100-year flood, determined by approximate methods, no base flood elevations or Flood Hazard Factors determined.

Zone A3:	Special Flood Hazard Areas inundated by the 100-year flood, determined by detailed methods; base flood elevations shown, and zones subdivided according to Flood Hazard Factors.
Zone B:	Areas between the Special Flood Hazard Area and the limits of the 500-year flood. Zone B is not subdivided.
Zone C:	Areas not subject to flooding by the 500-year flood; not subdivided.

Table 1, "Flood Insurance Zone Data," summarizes the flood elevation differences, Flood Hazard Factors, flood insurance zones and base flood elevations for each flooding source studied in detail in the community.

5.4 Flood Insurance Rate Map Description

The Flood Insurance Rate Map for the Village of Amityville is, for insurance purposes, the principal result of the Flood Insurance Study. This map contains the official delineation of flood insurance zones and base flood elevation lines. Base flood elevation lines show the locations of the expected whole-foot water-surface elevations of the base (100-year) flood. This map is developed in accordance with the latest flood insurance map preparation guidelines published by the Federal Insurance Administration.

6.0 OTHER STUDIES

A Flood Prone Area Map for the Town of Babylon was prepared by the U. S. Geological Survey (Reference 8) which differs from the present study. The present study employed more sophisticated methods than were possible under the Flood Prone study.

Flood Insurance Studies are currently being prepared by the New York District Office of the U. S. Army Corps of Engineers for the Town of Babylon and for the incorporated villages of Babylon and Lindenhurst, which are being coordinated with this study of Amityville.

The present study is authoritative for purposes of the Flood Insurance Program and the data presented supersedes all previous determinations.

FLOODING SOURCE	PANEL[1]	ELEVATION DIFFERENCE[2] BETWEEN 1.0% (100-YEAR) FLOOD AND			FHF	ZONE	BASE FLOOD ELEVATION[3]
		10% (10 YR.)	2% (50 YR.)	0.2% (500 YR.)			
Great South Bay Reach 1	01	-1.4	-1.2	+3.8	015	A3	5

[1]FLOOD INSURANCE RATE MAP PANEL
[2]WEIGHTED AVERAGE
[3]ROUNDED TO NEAREST FOOT

TABLE 1

FEDERAL EMERGENCY MANAGEMENT AGENCY
Federal Insurance Administration

VILLAGE OF LINDENHURST, NY
(SUFFOLK CO.)

FLOOD INSURANCE ZONE DATA

GREAT SOUTH BAY

7.0 LOCATION OF DATA

Survey, hydrologic and other pertinent data used in this study are on file for five (5) years through November 1980, at the New York District Office of the U. S. Army Corps of Engineers.

8.0 BIBLIOGRAPHY AND REFERENCES

1. David M. Ludlum, Early American Hurricanes, 1492-1870, Boston, American Meteorological Society, 1963.

2. I. R. Tannehill, Hurricanes - Their Nature and History, Westport, CT, Greenwood Press, Inc., 1956.

3. U. S. Army Corps of Engineers, Beach Erosion Control and Interim Hurricane Study, Atlantic Coast of Long Island, New York, Jones Inlet to Rockaway Inlet, January 1973.

4. U. S. Department of Commerce, Technical Paper No. 48, "Characteristics of the Hurricane Storm Surge," D. Lee Harris, National Weather Service, 1963.

5. U. S. Geological Survey, Water Resources Data for New York, Part 1, Water-Surface Records (Water Years 1945 to 1973).

6. Water Resources Council, "A Uniform Technique for Determining Flood Flow Frequencies," Bulletin 15, December 1967.

7. U. S. Army Corps of Engineers, Cooperative Beach Erosion Control and Interim Hurricane Study (Survey), Atlantic Coast of Long Island, New York, Fire Island Inlet to Montauk Point, July 1958.

8. Tri-State Transportation Commission, Aerial Photographic Sheets 1939, 1940, 1941, 1969, 1970, 1971, 1972, 1973, 1974, 1997, 1998, 1999, 2000, 2001, 2002, 2024, 2025, 2026. Scale 1"=200', 1970.

9. U. S. Geological Survey, 15-Minute Series Topographic Flood Prone Maps, Scale 1:62,500, Contour Interval 5 feet: Babylon, New York, 1969.

10. Bowe, Albertson and Associates, Topographic Maps, Sewage Works Studies, Five Western Towns, Suffolk County, New York, Scale 1:200', Contour Interval 5 feet, June, 1964.

Chow, Ven Te, Handbook of Applied Hydrology, New York, McGraw-Hill, 1964.

King, H. W. and E. F. Brater, Handbook of Hydraulics, New York, McGraw-hill, 1963.

U. S. Army Corps of Engineers, Tidal Flood Plain Information, South Shore of Nassau County, Long Island, New York, June 1971.

U. S. Army Corps of Engineers, Sacramento District, "Statistical Methods in Hydrology," Leo R. Beard, January 1962.

U. S. Department of Commerce, Technical Paper No. 40, "Rainfall Frequency Atlas of the United States," May 1961.

U. S. Geological Survey, Professional Paper 627-A, The Precipitation Regime of Long Island, New York, J. F. Miller and R. H. Frederick, 1969.

best copy available